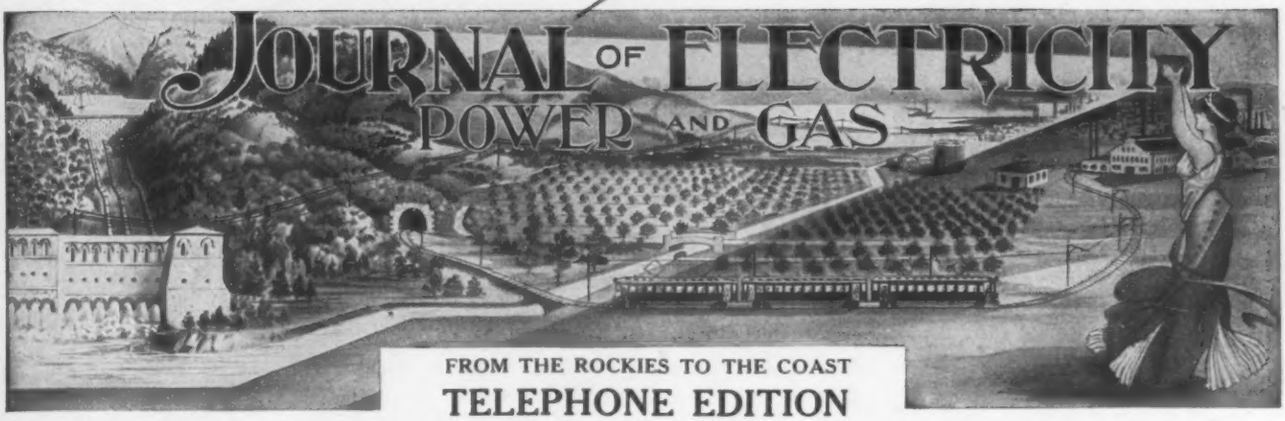

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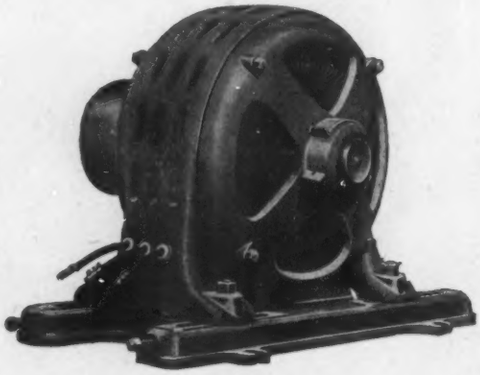

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THE CHARGE FOR POWER PLANTS IN NATIONAL FORESTS.

By Philip P. Wells.*

With reference to Mr. F. G. Baum's letters with their accompanying papers† discussing the principles upon which the charge imposed by the Forest Service upon power plants operating in National Forests should be based and the measure by which its amount should be determined:

Sierra Power House.

The act of June 4, 1897 (30 Stat. 35) gives the Secretary of Agriculture (Secretary of the Interior before the act of February 1, 1905, 33 Stat. 628) full power to regulate the occupancy and use of the National Forests. His right to charge a fair price for such occupancy and use is conceded by Mr. Baum, has been expressly declared by the Attorney-General (25 Op. 470; 26 Op. 421), and has never been denied or even seriously attacked in the courts. The only question is, What is the proper rate of charge? This is an administrative question and is treated by Mr. Baum as such.

When the Secretary proceeds to make up his mind how much he shall charge for any occupancy or use of the National Forests he may properly consider three things: Land, resources and services. Under resources the question may arise

*Law Officer, Department of Agriculture.

†Journal of Electricity, Power and Gas, July 4, 18, 25, August 1, 15, 29, 1908.

whether the law has separated certain of the natural resources from the land and opened them to private appropriation under specific conditions. Thus, the mineral resources may be appropriated, and the power companies earnestly contend that the waters are in like manner subject to private appropriation. Without passing upon this legal contention the Forest Service has by administrative action conceded it and has not based its charge upon this resource (the water), but only upon the land and the services.

The services rendered by the government in conserving water are considered by Mr. Baum to be the only basis for the charge which should be imposed upon the power companies. From this he argues that the charge should be proportionate to the expense of the services; that the power companies should bear but a part of that expense since other interests receive benefits from the services; that the expense of the services should not be averaged for the whole country and the rate of charge made uniform accordingly, but that power permittees in a State where the expense is low should be charged less than in a State where it is high, and still further that the charge should vary on every watershed in accordance with the expense of forest conservation thereon; or rather in accordance with the just share of that expense which the power companies should be required to pay. In passing, it may be noted that the expense of reforestation as it ought to be carried out, were funds available, could on this theory be charged upon the power companies, or at least a proportionate share of it could be so charged.

The land as a basis for the charge is entirely ignored by Mr. Baum. This is the fundamental error in his discussion. The legal duty of the Secretary is to regulate the occupancy and use of the land, and his legal right to charge rests upon and is measured by that duty. Some of the land of the forests is of great value for particular purposes. Some of it is of slight value for any purpose. In regulating its occupancy and use the Secretary has the right and it is his duty to consider the public interest and see to it that the right to occupy and use valuable lands belonging to all the people shall be acquired only upon condition that just payment is made to all the people in proportion to the value of the land occupied and used.

So far as power plants are concerned, the value of the land, if the natural waterflow as it would be without forest conservation is not considered, consists of the storage reservoir sites, the fall available for water power development, and the steadiness of waterflow which is maintained by the services of the government in forest conservation. All the waters of the Pacific are worthless for power purposes at an island in midocean, but a small stream on the slope of the Sierras may be very valuable for power purposes. In other words, the fall is the chief element of land value for water power purposes.

With this introductory explanation of the policy of the Forest Service in regard to the charge imposed upon power plants I will take up Mr. Baum's points in their order.

1. As explained above, the amount of the charge should be based upon the value of the land and services. Theoretically, it should not be limited by the cost of National Forest administration. There is no reason why a surplus of National Forest receipts over National Forest expenditures should not exist, and the President, in his message of February 26th, transmitting the report of the Inland Waterways Commission, has expressed the opinion that such a surplus derived from the charge on power plants "should naturally be devoted to the development of our inland waterways." As a matter of fact, the total income from the National Forests will not during this fiscal year pay the cost of administration.

2. It follows that any revenue derived from a California forest, even if it were in excess of the expenditures of the Government upon that forest, may properly be appropriated by Congress for any national purpose whatever. The reclamation fund and the proposed inland waterways fund offer two appropriate objects for the expenditure of any surplus from the National Forests.

3. It follows, further, that any surplus derived from one forest may properly be expended to cover a deficit arising upon another. The people settled in the neighborhood of any one forest may, in general, be properly preferred to people at a distance, so far as the right to use the land and resources of the forest is concerned. They should, however, pay a fair price for all exclusive commercial privileges which they get. In other words, they should not be preferred to others as to price, but should be preferred at the same price. This is the rule in the case of grazing permits, which are further restricted to prevent monopoly by large owners. Timber sales of more than $100 in value are by law required to be made to the highest bidder after advertisement, without regard to the residence of the bidder (Act of June 4, 1897, 30 Stat. 35).

4. Since the correct principle is to make a reasonable annual charge, proportioned to the power value of the land occupied and the services rendered, it follows that any surplus thus derived from one watershed may properly be expended upon another.

5. With reference to the example suggested by Mr. Baum: Let us suppose that two watersheds have the same area and the same rainfall. Their power value may differ from several causes. Deforestation on one may cause the rainfall to run off rapidly and be followed by drought, whereas the forest cover on the other may maintain a steady flow. This difference is due to the service rendered by the Government in conserving the forest cover. Other differences may be due to the land value rather than to services. Thus there may be a large natural storage in lakes, capacity for large artificial storage at small expense in reservoir sites, and above all a large total fall on one watershed as opposed to less advantageous conditions in these respects on the other. On the watershed having most advantages the Government may properly charge what those advantages are worth and apply this surplus thus derived to the reforestation of the other watershed. If the charge is to be a function of the cost of forest conservation, it should also be a function of the cost of reforestation where that is necessary, and the power plants operating upon the less advantageous watershed should on that theory be charged with the heavy and prohibitive expense of artificial reforestation.

6. The policy of the Reclamation Service in fixing their charges for water rights on each irrigation project according to the cost of that project is not a precedent which should be followed in fixing charges for power plants in National Forests. It is the policy of the Government to give land for homes without charge, and it is, therefore, proper to furnish water to irrigate the land at cost. Other natural resources in Government ownership should not be given away, but should be kept as the property and for the benefit of the whole people in perpetuity. The right to use them for a limited time should be given on such terms as to allow a fair profit, but the surplus over such profit should go to the whole people, who should retain full control. This is the only adequate defense against oppressive monopoly.

7. Railroad ties are sold at their market value, as required by the Act of June 4, 1897 (30 Stat. 35). Their value is not calculated upon the expense of administering the forest from which they are cut. If any surplus results from such timber sales, it may properly be used to meet a deficit incurred in the administration of another forest. The grazing fees are not fixed with reference to the cost of administration of the particular forest for which any permit is issued, but they are an approximation to the grazing value of the land. With reference to minerals, the President has recommended that *mineral fuels* on the public lands should be leased for a royalty to prevent monopoly and waste, insure development, and incidentally provide a revenue. The legality of such mineral leases has been affirmed by the Supreme Court (U. S. v. Gratiot, 39 U. S. 526).

8. Early precedents are against Mr. Baum's argument. For example, the policy of mineral leases (U. S. v. Gratiot, above cited) and the sale of agricultural land produced revenue in early days, and always at prices to induce settlement, without any difference in the price paid by the settler proportionate to the price paid by the Government for the cession from Louisana, Spain, or Mexico; in later times the gift of agricultural land in utter disregard of the cost of such land to the Government; the gift of construction timber to railroads in order to promote railroad development without regard to the cost of the land to the Government. In all these cases where the natural resources have been sold or given, the cost to the Government has not been considered. A new policy is now demanded by the pressure of population and the exhaustion and waste of natural resources. The Government should now get a fair price for what it gives (except homes), based upon the value of the thing given, and not upon the cost of conserving it.

9. It is essential that the natural resources still under Government control should not be permanently monopolized in private hands. It follows that rights of way for pipe lines, powerhouses, reservoir sites, and the like, should not be sold, but should be rented at a fair price for a limited term, say, fifty years, and under conditions which will prevent waste and monopoly. At the end of the term the conditions should be readjusted as circumstances may demand. During the term the permits should be irrevocable, except for breach of condition.

10. The charge for rights of way should not be at a uniform acreage value. The land is valuable to the seller according to the measure by which it is valuable to the purchaser. A strip of land for a conduit is of little value if it affords a small fall, and of great value if it affords a large one. There is no reason why the great value should be given away without adequate compensation to the Government.

11. Since the fall is one element of land value for power purposes and the total power development depends in part upon the fall, it is entirely proper to have the charge vary in proportion to the total power developed. The promoter who really discovers a better power development than another, will still have every legitimate benefit which belongs to him for the discovery. If it is profitable to develop 5,000 kilowatts at a given charge per kilowatt, it will obviously be more profitable to develop 50,000 kilowatts at the same rate of charge.

12. The uniform charge per kilowatt hour neither promotes nor restrains waste. In the absence of other regulation, the size of a system put in will be determined by the promoter's expectation of profit, and, in general, a large development is more economical, and therefore more profitable, per unit than a small one up to a certain point. Beyond that point the Government should impose conditions to prevent waste, as it now does in timber sales. A purchaser of timber is not allowed to take the best trees or those which he may get most cheaply, and leave the rest, but is required to take all merchantable timber. If he wastes by cutting the stumps too high, or by leaving the tops, he must pay for what he leaves as if he had taken it. The man who sells his power for $20 per kilowatt year probably has a big market and low operating expense as compared with the man who sells for $40 per kilowatt year. The man who transmits power a long distance will not do so except for the profit he expects, and he will do so for that profit notwithstanding the charge. While long-distance electrical transmission may properly be encouraged, the equalizing of conditions by the railroads, which Mr. Baum refers to, has been the cover for great abuses, and his illustration is at least unfortunate.

13. Mr. Baum's argument against charging a power company which has a storage reservoir seems wrong on his own hypothesis by which the cost of forest conservation on the watershed should determine the charge. It should be remembered that the forest cover keeps the reservoir from silting up, and, moreover, that company should pay for the fall which they get by their permit. The Forest Service proposes to make a reduction on account of water storage. The plan now under consideration is to deduct one-half of the rate on account of all power produced by stored water over and above what would have been produced by the natural flow of the streams.

14. Mr. Baum's illustration of the matter dealt with in the last paragraph is unfortunate. The rental for a sawmill site varies in proportion to the capacity of the mill. Moreover, a power site is a natural monopoly of extreme type. It is at least doubtful whether the power company could have fairly purchased the reservoir site for power before the forest was created. Such sites have been acquired by fraudulent homestead and mining claims, pretended irrigation schemes, etc., but the only lawful way to acquire them from the Government for power purposes is by a revocable permit under the Act of February 15, 1901. Even if the owner got it fairly, it is but a part of his whole plant. The Forest Service still furnishes him the fall without which his reservoir would be worthless. It is proper for him to claim a reduction on account of his reservoir, but it is not proper for him to ask the Government to give him the fall.

15. As has already been stated, Mr. Baum's plan would not treat the power interests as others are treated. On the contrary, the price for timber, grazing, hotel, and other uses of forest lands and resources is never based upon the cost of forest conservation. It would involve monopoly of power by the passing of all power sites into perpetual private ownership, and would, therefore, not make for efficiency and the maximum use of the resources. Government control is necessary for these.

16. Rights of way should not be permanent, but should be acquired by permits irrevocable for a fixed term for the reasons given above. This is generally recognized as the proper policy for public utility franchises in cities, which is a parallel case.

17. Investors might be pleased by a gift in perpetuity of power sites in the National Forests. Any gratuity from the United States would doubtless be welcome by the person to whom it was given. That is not a sufficient reason for making the gift. Moreover, the demand for rights in perpetuity seems not to come from investors, but from the promoters of power schemes and those who desire a monopoly. The experience of the Forest Service is that the genuine investors would be satisfied with a long term, irrevocable tenure at a charge fixed in advance, so that they could from the first foresee the utmost burden to be imposed on them by the Government.

18. Mr. Baum's argument that the power companies should receive treatment uniform with that accorded to the farmer, the lumberman, the railroads, and other interests, has already been disposed of. The farmer is a home-maker, and is given an opportunity to earn by hard labor a modest support for himself and his family. The lumberman pays the market value of what he gets. Railroad grants were made in the days when the natural resources of the country were thought to be inexhaustible and monopoly was not foreseen. Railroads are now subject to the Governmental control under the interstate com-

merce clause of the Constitution, and the people are determined to exercise such control. The control over the threatened water-power monopoly, so far as the National Forests are concerned, is dependent upon the Government's retaining title to power sites and granting the permits to use them upon such reasonable conditions as will prevent abuses and at the same time fully encourage development.

19. There is a reason for especial care in the Government's dealing with water power. It offers an unexampled opportunity for a consolidated monopoly of extreme type. Genuine freedom is impossible unless this monopoly and others like it are checked and controlled in the interest of all the people.

20. Mr. Baum's argument for the conservation charge based only on cost and the permanent alienation of rights of way, has been already reviewed.

21. The need of water-power development to conserve the mineral fuels, is thoroughly understood by the Forest Service. The development of power sites for which permits are issued by the Service is secured by imposing the condition that work shall be begun within a definite, specified time fixed in the permit and completed within another definite, specified period fixed in the permit. If these conditions are not complied with, the permit is revoked, unless physical conditions have made compliance impossible. In such case an extension may be granted. Moreover, the permit must be actively used for a minimum period in each year, or it will be revoked. If title were to pass permanently to private owners, it would be impossible to insure full development. The fear of a water-power monopoly, instead of being absurd, is well-founded.

22. In brief, water-power development should be encouraged. The charge to power permittees should be reasonable, and rights of way should be irrevocable, except for breach of condition, for a fixed term sufficiently long to insure investment.

23. In conclusion:

A. The charge for power permits should be based on the power value of the land occupied and the value of the services rendered by the Government.

B. The proceeds from any particular permit may legally be appropriated by Congress for any public purpose, and the same policy may properly be used for the expense of administering National Forests, or for the reclamation fund or for the proposed inland waterways fund.

C. The plan of calculating the maximum conservation charge upon the yearly cost of forest conservation to the Government would be impracticable for the additional reason that such cost ought to be vastly higher than it now is. In the European forests the cost is several dollars per acre as against less than one cent per acre in this country.

D. The question of the charge for power plants is a unit. In considering it the rental value of the land and the value of the services rendered by the Government in forest conservation should and must be considered together.

E. The rental value for *power purposes* of the lands occupied should be paid by the permittee, not merely their value for forest purposes, farm purposes, and the like. The Government is entitled to their value for all purposes, especially including the purpose for which they are actually occupied (Boom Co. v. Patterson, 98 U. S. 403). This value must be fixed by the administrative officers of the Government at such a rate as will encourage the taking of permits. But the Government should retain permanent ownership, subject to the temporary right of the permittee to use the land.

F. Practical considerations of administration make it desirable that the charge for power plants should be uniform. It has therefore been fixed at a rate which is believed to be sufficiently low not to check the development of any project.

HANDLING A BURGLARY BY TELEPHONE.

It falls to the lot of very few people to sit quietly at a telephone and listen to a burglary, including the firing of revolvers, the crash of glass and the screams of women, at the other end, but according to the following account in the New York Sun, this is what happened to a New York police lieutenant recently:

The man on duty at the telephone bureau at Police Headquarters at 3 o'clock this morning received a message that a robbery was about to be carried out at 142 Second Avenue. The speaker at the other end of the wire was connected with the Fifth Street police station, where Lieut. Barney Keleher was at the desk.

"Hello!" said a voice. "This is 142 Second Avenue. Burglars are outside. They are about to enter. There!—the key in our lock has just been pushed in by another key on the outside. Send——"

"Who is this talking?" asked Lieut. Keleher.

"Dr. Eisenberg."

The voice was low and even.

"The burglars are rattling the key. Shall I shoot when they open the door? Is that the proper thing to do?"

"Of course it is," advised the police lieutenant. "Plug them good. Have you got a gun?"

"I've got a 44-calibre Colt," said the voice.

"That'll do the business," said Lieut. Keleher. "Just go and plug——"

A revolver shot rang out, followed by a woman's scream. A moment's silence and there was a crash of glass, another shot and then more silence.

"Hello, hello!" called Lieut. Keleher. "Can you hear me? Is any one there?"

He received a reply and asked, "Did you fire that shot?"

"Yes, I fired it."

"Hit him?" demanded Keleher.

"No."

"Who fired the second shot?"

"I did, and he got away."

Meanwhile Lieut. Keleher had sent a squad of police to the Second Avenue house, and two detectives were on their way from the central office. The scene of what Lieut. Keleher had heard over the phone was in the office of Dr. Siereani, on the second floor at 142 Second Avenue. Dr. Siereani, a dentist, is abroad with his family, and Dr. Eisenberg, who was the man with whom Lieut. Keleher talked, has charge of the office in his absence.

No trace of the intruder was found when the police reached the office. Dr. Eisenberg said he had been awakened by a noise outside the office door and did not know whether he had the right to shoot, and so had telephoned to the police to find out. The scream which Lieut. Keleher had heard was that of a woman servant who was in the house.

TELEPHONE STATISTICS.

There are 7,000,000 telephones and about 13,000,000 miles of telephone wires in operation in this country. The wires reach from the Atlantic to the Pacific and from Canada to Mexico, and a man in New York can talk to a man in Omaha, and each can hear the other as distinctly as though one were in the Bronx and the other at the Battery. New York will soon be able to talk with San Francisco. The value of the wire and other apparatus and the labor cost for installation amounts to about $175,000,000. There are about 25,000,000 toll connections throughout the United States and more than 8,000,000,000 exchange connections. The cost of maintaining the standard of service is enormous. Last year the various telephone companies paid out about $54,000,000 for maintenance and reconstruction of plants.

SELECTIVE TELEPHONE SIGNALLING.

By J. E. McGillivray.

The problem of the multi-telephone line is one that has always been with us and the history of its development would seem to be marked by two distinct advances: First, the change to bridging party lines, and recently the change to harmonic selective bridging party lines. In the earlier types of series telephones, where the ringer coils were permanently included in the talking circuit, the scope of signalling was limited and other disadvantages were found. As the number of stations was increased the talking efficiency was lessened in a much more rapid ratio than with the later type of bridging sets, due to the large amount of retardation in series in the talking circuit.

While the series telephone was all right for short lines, its limitations prevented its satisfactory use on lines of any length. The bridging bell designed by Mr. Carty came into use almost twenty years ago, and until a comparatively recent date was built with a 1000-ohm ringer resistance. A higher resistance than this, with the longer lines that have become common, and the more exacting service conditions to be met with, would seem to be good practice, and the standard type is now a 1600-ohm bell. Some few factories use a higher resistance than this, but the 1600-ohm bell would seem to give the best results. There has never been a time in the history of the telephone that some one has not just perfected some lock-out selective signal scheme warranted to cure all the ills of party-line service, and it goes without saying that this stuff eventually all finds its way to the junk heap.

I have before me a letter from a rural telephone company in which the writer says: "We are using ——— secret service lock-out system and ——— Telephone Supply Co.'s phones and ——— (Chicago mail-order department store) make of switchboard, and carry material for the repair of all these and our switchboard, and do not care to add new makes to our already constructed system, and will not so long as our present system is giving such **splendid satisfaction.**" The writer of this letter runs a general store, is a county officer, and undeniably must be an expert in the telephone line.

A contemplation of what he is doing will be enough to make old telephone men who have had their troubles with straight bridging lines sit up and take notice. The telephone field bears a relation to politics in the fact that a good deal lies in argument, and the opposing opinions maintained are amazing. All of which indicates that we are still working very much along experimental lines.

Divergent opinion in telephone work has been greatly in evidence along the line of selective party-line equipment, but there is good reason to assume that this is becoming crystalized and that the commonly accepted selective party-line system of the future will be that which operates on the harmonic principle. A great many of these plants have been installed in the last year or two and they are giving good satisfaction.

Thirteen years ago the Sunset Telephone & Telegraph Company, at the suggestion of Mr. Lighthipe and Mr. Glass, made quite extensive experiments with harmonics, using "reeds" of various lengths, the arc of their movement tuned or predetermined to respond to certain predetermined periodicities of current. No other corrective means were employed. A number of lines equipped with this signalling apparatus were installed at Sacramento and after a few months' service were discontinued. A difference of opinion seems to exist as to how good the signalling was. I have it from a former official of that company that "these lines worked so well that the system was discontinued for fear that all of the subscribers would change to party-line service." On the other hand there is a repairman at Sacramento who at that time was "shooting trouble" on the Sunset exchange. He does not believe in harmonics and it is doubtful if he ever will.

The credit for demonstrating the practicability of harmonic signalling would seem to belong to Mr. Dean, then chief engineer and now president of the Dean Electric Co. The essentials for satisfactory signalling are an exact periodicity with a different frequency for each different bell and a different voltage for each different bell and a spring ringer mechanically perfect and in perfect magnetic balance. The frequencies in common use are 16, 33, 50 and 66.

Harmonic selective signalling on party lines has been a dream for so long it is hard to wake up to the fact that it is here with us to stay and be a feature of all modern, up-to-date telephone installations of the future. That it is a success in every way admits of no doubt, for we have it on a number of plants in operation. In only one instance in recent installations of any size has difficulty been encountered, and that was not a fault of the apparatus but due to variation in voltage which as with the frequencies must be kept constant.

TRAINING THE OPERATOR.

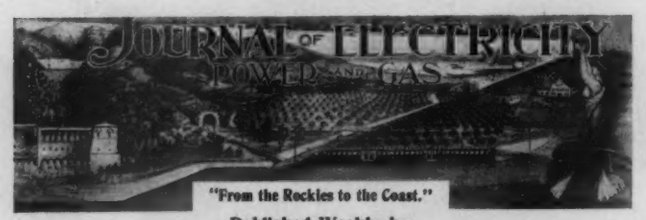
In recent years the system of obtaining operators has changed. Not long ago a "hello" girl was employed after a superficial course of instruction. Poor service was the result. Now the telephone companies have schools of instruction for the telephone operators. Sometimes it takes weeks for a "hello" girl to get all the details of the work and to be graduated as a reliable operator. Often there are cases where girls are found unsuited for the work. These schools of instruction cost the students nothing. The instructors are experts who have been in the employ of the company for several years. In these schools of instruction the prospective "hello" girl is drilled in calming the irritable customer who wants a number and wants it quick; also the customer who makes all the trouble he can for the girl at the switchboard. There is a set phraseology of replies to certain queries. All these she has to learn letter perfect. The experts say that a girl must have imagination to become a good operator. She has to see in her mind's eye all that is taking place on the wires and to be ready for every emergency. Without that, the "hello" girl will always prove a failure.

WIRELESS TELEGRAPHY IN PACIFIC.

Consul Julius D. Dreher sends from Tahiti the following information in regard to a network of wireless telegraphy, which it is proposed to establish among the scattered islands of the Pacific Ocean:

Capitalists who are interested in the extensive phosphate operations on Ocean and Pleasant Islands of the Gilbert group, and in the new works about to be established on the Island of Makatea of the Tuamotu Archipelago, have recently begun a movement to connect nearly all the groups of islands in the South Pacific by a system of wireless telegraphy. It is proposed to include in this system the Commonwealth of Australia, the Dominion of New Zealand, the Fijis, the New Hebrides, the Solomon, Samoan, Cook, Society, and Marquesa Islands, and the phosphate islands of Ocean, Pleasant, and Makatea.

It is expected that the various governments having possessions in the South Pacific will aid in the establishment of the proposed system. Negotiations have already proceeded so far that the success of the efforts seems to be almost assured. As the nearest available ocean cable office to Tahiti is at Auckland, 2,250 miles away, from which a steamship of the Union Line of New Zealand arrives at Papeete once every twenty-eight days, and a direct communication by a steamship of the Oceanic Company with San Francisco, 3,658 miles distant, is had once in every thirty-six days, it will be understood how deeply interested the French colony of Tahiti and its dependencies are in the complete success of these negotiations. Other groups of islands are equally interested in the establishment of this system, which means so much to the inhabitants of these widely-separated archipelagoes.



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Train Dispatching By Telephone

While there is little likelihood that telegraphy will ever become one of the "lost arts," or that telegraph instruments will be relegated to the museum of antiquities, yet the next decade will undoubtedly see many telegraph instruments replaced by telephone sets. Several of the newly built railroads, particularly interurban electric, initially installed telephones for train dispatching. The satisfaction given by these has been such as to convince other roads of their superiority and to cause telephone lines to be substituted for telegraph, until today twenty per cent of all the operating roads of this country are using telephones in handling trains.

This change has been effected notwithstanding the opposition of the old time conservative operators. Conservatism is the choke-coil in the circuit of progress. It retards the sudden rushes of ill-advised action. Yet in excess, like inductance, it is not always desirable. In this case its action has been neutralized by the enforcement of the Federal Nine-Hour law, which limits the hours of labor and correspondingly increases the number of telegraph operators. This law resulted from the antagonistic attitude of the radical element, whose demands were backed up by strikes. But, contrary to the fondest hopes, several railroad companies curtailed the telegraph service and substituted the telephone in its place.

But even without this accelerating force the manifest advantages of the telephone would eventually have forced its recognition in the railway world, as it has already done in the commercial. Numerous railway officials have testified as to its comparative safety and greater speed. As its use involves nothing more than the ability to talk and hear, and does not require technical training, efficient operators are easily found. Its greater original cost is compensated by better service and by maintenance of fewer stations, for telephone instruments can be placed at convenient intervals and used by conductors. Simultaneous telephony and telegraphy over the same telegraph circuit tends to reduce the first expense, although a complete metallic circuit gives the best results. Accuracy is ensured by requiring that the messages be written and repeated by the receiver.

The Burlington, the New York Central, the Lake Shore and the Lackawanna systems, among others, have had signal success with telephones for train dispatching. The Santa Fe operates 1,800 miles of track by telephone exclusively; the Union Pacific has 500 miles of composite telephone and telegraph in use between Omaha and Cheyenne, and the Canadian Pacific has done likewise between Montreal and Winnipeg, a distance of 1,430 miles.

The day is not far distant when the engineer in his cab will be in constant communication not only with his conductor but also with the dispatcher. Directions and warnings will be instantly communicated to a moving train, and many accidents thus avoided. Then indeed will it be "safer to travel than to stay at home."

The Forester's Domain

In all deference to the able opinion given by Mr. Phillip P. Wells, law officer in the Department of Agriculture at Washington, D. C., in an article that appears on another page of this journal, entitled "The Charge for Power Plants in National Forests," we must take issue with him on several of his arguments.

The vice of the present system lies in the fact that to one man, the Secretary of Agriculture, is given the power, absolute and final, to regulate the occupancy and use of vast tracts of land, and to fix arbitrarily the charges to be levied on enterprises therein which, in their nature, are of great public importance.

The viciousness of this stupendous delegation of power would be more apparent to its present supporters, and to the people, if a Secretary of Agriculture out of sympathy with the spirit of conservation should unfortunately come into power.

No office created by the constitution or contemplated by the founders of this form of government ever conceived of delegating any such power to an individual, and particularly an individual holding an appointive office. We should never forget, after all, that this is a people's government.

No power lodged in any one man in State or federal authority has such an immensity of scope as has the Secretary of Agriculture over a domain (the forest reserve) greater than that of the thirteen original States.

Against the integrity or the earnestness or the fairness of the gentleman who at present administers the duties of this great trust, no man may in truth whisper an objection.

But this does not justify the policy.

If it did, an empire or a despotism might be built upon the reputation of the original despot, that he was a good man who dealt out justice with mercy and kindness toward a loving people.

Under the wide power vested in the Secretary he may beckon and thousands of new citizens will hurry to embrace the opportunities of a given State. He may raise his hand in protest and the tide of immigration stands still. He may by the stroke of his pen give enterprise the stimulus that will set idle thousands at remunerative work, or he may draw a dead line beyond which thrift and industry may not enter. His word is law, and stands above the will of the people, above that of governor and legislators in a domain of over a quarter of a million square miles, scattered over a dozen States. He may say to capital, You cannot enter here, and enterprise languishes.

He controls the destiny of States. He may dam up the rich resources of a commonwealth, may say "nay" to progress and shut out from the inhabitants the use of their own resources.

This power, this mere statutory power, delivered over to a single individual does not dovetail anywhere with the fundamentals of a republican form of government. It is too broad, too arbitrary, too czar-like, too absolute.

Yet something must be done toward conserving the natural resources of the nation. The world recognizes that. None may dispute the power of the federal government. The power belongs with Congress, not with individuals. We may not and we do not question the naked right of power, but we may question and we do question methods, and we may, as a matter of right, offer suggestions for a better and a more democratic form of control, a control that takes all sides and all points of view into consideration and that fixes equitable rules for the administration of these great properties.

Obviously the preparation for such a control, wherever it be ultimately lodged, should grow out of the recommendations of intelligent discussion among men wise on such affairs, and peculiarly fitted because of education or calling to judge wisely. To this end we have to suggest the appointment by the President or by Congress of a non-partisan commission, selected at large from residents of the States most closely affected, of known probity and intelligence, from each industry or calling affected by the regulations. Let these men take testimony and devise methods and suggest legislation that will solve this great modern American problem.

PERSONAL.

J. E. McGillivray, of the American Electric Telephone Co., is making an extended trip throughout the Northwest.

W. I. Otis, of Otis & Squires, of San Francisco, is taking a trip throughout Southern California, in the interests of the houses his firm represents.

W. W. Briggs, manager of the San Francisco office of the Westinghouse Electric & Mfg. Co., is making a short trip East.

J. E. Bridges, of the Westinghouse Electric & Mfg. Co., started on a six weeks' trip East, this week.

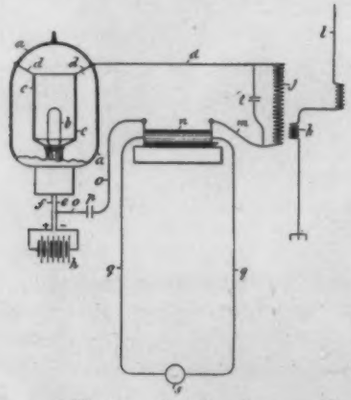
BOOKS RECEIVED.

In "Telephone Construction—Methods and Cost," C. Mayer discusses the best methods of telephone construction and the cost of such work in all its details. Beginning with the advantages of cost records to telephone companies and to contractors for telephone work, Mr. Mayer presents a simple and comprehensive system for collecting, analyzing and recording telephone costs, showing forms and blanks for every division of the work, and explaining the methods of computing, proportioning and pro-rating costs of all kinds. Successive chapters describe methods of construction for pole line, cable construction, cable splicing, removing old line and renewal, underground conduit, and miscellaneous structures. Costs are given for every part of the work, these costs being averaged from actual cost records kept on many hundreds of jobs. In a concluding chapter he tells how to use the costs as given in making estimates, taking an actual job of large size and working out the estimate in detail, with clear explanations of all the considerations to be kept in mind. An appendix, by J. C. Slippy, gives cost of materials and labor, compiled from the actual records of a large company. Miscellaneous cost data on pole-line and underground conduit construction conclude this excellent volume. The price is $3.00, net, postpaid, and the book is published by The Myron C. Clark Publishing Company, Chicago, Ill.

PATENTS

RECEIVER FOR WIRELESS TELEGRAPHY. 896,130. Guglielmo Marconi, London, England, assignor to Marconi Wireless Telegraph Company of America, New York, N. Y.

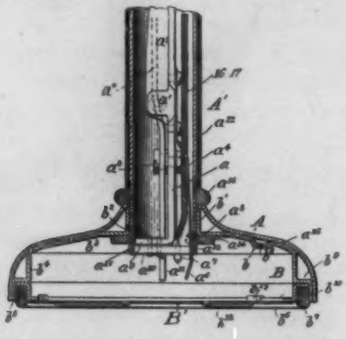
In a receiving apparatus for wireless telegraphy, the com-



bination with an oscillatory circuit, of an oscillation valve, an induction coil, the oscillation valve and the primary winding of the induction coil being connected in series and operatively connected with said oscillatory circuit, and a detecting device connected with the secondary winding of said induction coil.

TELEPHONE APPARATUS. 896,796. Sidney A. Beyland, Elyria, Ohio, assignor to The Dean Electric Company, Elyria, Ohio.

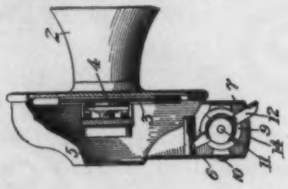
In a telephone desk set, a tubular standard, a base for such standard, telephone apparatus carried by such standard, a removable plate adapted to be supported in such base,



switching mechanism carried by such plate adapted to co-operate with operating mechanism carried in such standard and means for automatically closing electrical connection between such switching mechanism and such apparatus when such plate is placed in such base.

TELEPHONE CALL-REGISTER. 896,081. Byron B. Brockway, Cleveland, Ohio, assignor to The Dean Electric Company, Elyria, Ohio.

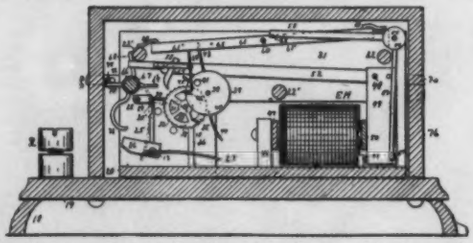
In a device of the class described, the combination with a transmitter having a front plate and a diaphragm bearing thereagainst, of an inclosing shell mounted on the front plate, a registering device carried within and behind said front plate so as to be visible to the user of the telephone, means for operating said registering device, a sounding device, said register-operating means adapted also to operate said sound-



ing device so that at the same time the sound is communicated to the diaphragm from the sounding device, the register is operated to record the call, and a lever permanently connected to such register extending through such shell, adapted to operate such register.

SELECTIVE CALL APPARATUS. 896,832. John A. Hulit, Topeka, Kan.

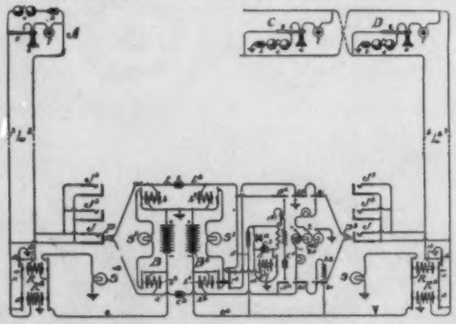
The combination of an electromagnet, a main propelling lever adapted to progress the ratchet, a switch-shifting ratchet, a slowly moving holding pawl adapted to be thrown from the ratchet when the ratchet is progressed and to be re-



turnable thereto slowly by its own force, a balance bar tending naturally to throw off the holding pawl and actuated in the other direction by the main lever, a trip support to sustain the balance bar away from the holding pawl and means co-operating with the ratchet and selectively arranged for controlling the trip support.

TELEPHONE SYSTEM. 897,042. Alfred H. Weiss, Chicago, Ill., assignor to Kellogg Switchboard and Supply Company, Chicago, Ill.

The combination with a telephone line extending in two limbs to the central station, of a signal circuit associated therewith, a relay winding permanently connected between one of said limbs and a third conductor and out of the path of calling current from the subscriber's station, a contact in



said signal circuit controlled by said winding, a source of current at the central station adapted to be connected between said third conductor and the limb with which said relay winding is connected and to send current through said relay winding over a circuit including a portion of the talking circuit of the telephone line, said source also serving to furnish current to the subscriber's station for talking.

INDUSTRIAL

ELECTRIC SOLDERING TOOLS IN TELEPHONE WORK.

Nowhere is the electric soldering tool so effective as in general telephone exchange work. While these tools are superior in every way to old-fashioned appliances in all soldering operations, their peculiar suitability for just the kind of work which comes up on telephone lines and apparatus is so marked that they actually raise the standards in this work and point the way to far greater achievements in telephone manufacture and installation.

To the manufacturer they mean reduced costs and increased output.

To the exchange manager they mean connections that are strong and permanent and that materially reduce trouble on the lines.

The telephone man can do well to give special attention to the fact that with these electrically self-heated soldering appliances it is possible to obtain absolutely even temperatures which are bound to give those reliable results upon which all soldering work in telephone activity depends. In connection, it is just as important to remember that having this even temperature it is possible to obtain tools of just the right size to suit any particular operations.

It is thoroughly in evidence and now well known to the majority of telephone men that electric soldering appliances are cheaper than gas, that they obviate all the annoyances coincident with the use of gas appliances, that they are quicker, cleaner and permit greater skill. Workmen prefer them after they use them. On the whole, these electric soldering appliances are twenty-five years ahead of anything devised for telephone work, more in harmony with the spirit of it.

Vulcan electric soldering tools can be connected by cord to any lamp socket and used in any cramped position. In the manufacture of these tools, all the problems of operation have been anticipated because of an intimate acquaintance with the peculiar operations which come up in telephone work.

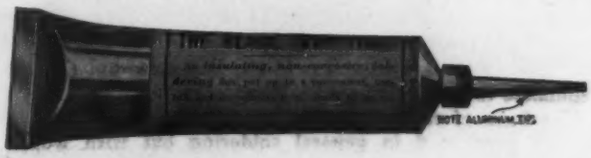
Special attention is directed to Vulcan electric soldering appliance No. 602, particularly designed and manufactured for telephone soldering, as is evidenced by its wonderful length and small diameter.

Thousands of Vulcan electric soldering appliances are now in use by telephone companies, giving eloquent recognition to the remarkable features of these tools.

As determined in experience with these tools covering a number of years, they are extremely hardy and have made excellent records in continuous daily service. In the manufacture of these tools, some fine grained engineering has resulted in a heating chamber and coils which are as near perfect in lasting qualities as they can be made. These tools perform the work required of them and as electric heating products they are high class in every respect. They are made by the Vulcan Electric Heating Company, 74 West Jackson Boulevard, Chicago.

BLAKE TUBE FLUX FOR SOLDERING.

The Blake Signal & Manufacturing Company are now putting up an excellent flux, in a collapsible tube with an aluminum spout, as shown in the accompanying cut. The flux is a paste of about the consistency of vaseline and is of the best quality. Strong acids undoubtedly clean the surfaces to be soldered, but they continue to eat and corrode the substance so that in a short time considerable damage results. This will not happen with Blake tube flux. The tube being tin-lined and coated is durable and yet perfectly flexible.



The spout being of aluminum will not become clogged nor soldered up and permits just the required amount of flux to be put exactly on the spot desired. This insures a good clean job of soldering. With flux put up in this form there is no waste, no mess, no splint needed, no box cover to get lost, no bottle to turn over or break, no accumulation of dust and grit; the last squeezed from the tube is as good and clean as the first. Two hands are not needed to apply this flux, for it may be applied at the same time as the soldering iron. In fact, in most cases the heat of the iron applied at the end of the aluminum spout will cause a sufficient quantity of flux to flow.

These advantages can be readily appreciated for all kinds of wiring, repair work, and in fact wherever a good, quick, neat job of soldering is desired. Each tube measures about 1x5 inches and contains two ounces of flux.

HARVARD ELECTRIC FIRE.

The Harvard Electric Co., 66 W. Van Buren St., Chicago, Ill., announces that although the main factory and stock were seriously damaged by a fire which occurred August 28th, it is in a position to take care of all orders. All orders in the Eastern territory will continue to be filled from the large stock of fuse wire, fuse links, telephone fuses, conduit boxes, sectional switch boxes, portable lamp guards, wire connectors, cleats, etc., carried by the Harvard Electric Co., 136 Liberty St., New York, N. Y.

The Chicago factory commenced work on Sept. 9th, with sufficient force to fill all orders promptly, and the Harvard Company has already perfected plans for a larger and more thoroughly equipped building, to be completed previous to November 1st.

Roos Bros. of San Francisco, have placed with the Sunbeam Incandescent Lamp Company, through their general distributors, the Western Electric Company, an order for 800 Tungsten lamps with Holophane reflectors. This is the first complete installation of Tungsten lamps in San Francisco.

FORMS, USES AND TESTS OF FLUX.

The noun, flux, describes the actual joining of parts soldered, it being derived from a Latin verb, "fluere," meaning "to flow." Obviously, flux may cover that "flowing" action of the heated parts, solder and compound which makes a joint. To the trade flux simply is the coined name of various forms of chemical compositions calculated to assist and direct the flow of the solder.

The chief forms are sticks, paste and liquid. For the liquid, a powdered form is sold which is diluted with water by the solderer. These forms are differentiated simply to suit the convenience and practicability in definite operations. The sticks, being handy, are suited to general ready soldering where the parts are more or less accessible. Paste satisfies the demands of "out-of-reach" jobs where the stick won't reach and the liquid suffices in instances where it is to be applied with a brush or squirt can or the parts soldered are to be dipped in a bath of the flux.

There are multitudes of fluxes to make solder run but these do not satisfy the demands of electrical experts. The problem has been to make an **electrical** as well as **mechanical** joint. To satisfy this requirement the flux must not destroy or minimize the insulation in the parts soldered.

The bane of such work has been muriatic acid. It has not only been used in general soldering but with woeful results in soldering operations in electrical manufacture and installation. Unfortunately, it has been adopted as the base of certain fluxes. Witness the result. A certain Eastern manufacturer, building high-grade motors, got a record order and at great expense and effort delivered and installed these, taking no small amount of satisfaction in the reputation of his product and the importance of this special contract. In a short space of time the motors were returned to him, all burned out and ready for the scrap. The cause was that in making commutator connections, splices, etc., and soldering on binding wires, an acid flux had been used. So a few cents worth of flux destroyed a few thousand dollars worth of motors.

Tests of Flux.

An electrical test was made recently of Allen-Flux to determine its actual efficiency in holding insulation. Allen-Flux is a well-known trade name covering the various forms of the electro-chemical soldering preparations of the L. B. Allen Company of Chicago, expert manufacturing chemists. There were measured two pieces of .04 wire, a foot long, fluxed with muriatic acid. By a corrected Wheatstone bridge the resistance measured four ohms. These wires were then broken apart, re-soldered with Allen-Flux, and the same bridge registered a resistance of only .013 of an ohm. Thereby hangs the tale of lost light and power current that might easily upset the owners of large buildings and plants where acid fluxes, used in wiring, etc., serve to waste constantly such current.

A mechanical test of Allen-Flux was made as described forthwith and the results are set down below.

Three fine copper wires were cut in two and re-soldered. Muriatic acid, the "next best" flux and Allen-Flux were used as fluxes, and the same amount of solder was melted. The wires were suspended supporting weights. The stress each joint withstood is noted in the following table:

	Wire broke at lbs. stress
Muriatic acid joint	100 lbs.
"Next Best Flux" joint	142 lbs.
Allen-Flux joint	204 lbs.

It might be important to note in this connection that this flux, being a rapid worker, can best keep pace with modern soldering appliances, such as electric soldering tools, for very fast, high-grade work, cappers for canneries, making a number of cans at one time, and for all the soldering operations of manufacturers who depend upon speed and multiplicity in output for returns.

General Experiments and Tests.

D. L. Fagnan, president N. A. S. E. No. 5, and chief engineer for a large meat packing company, who resides at Cleveland, Ohio, has described his personal study of the soldering stick as opposed to the liquid in an interesting letter faithfully reproduced forthwith:

"I herewith hand you report of test of Allen soldering stick. I changed many wires in our coolers, all No. 8, Allen soldering stick used throughout. Next I put a Wright discount meter in each side of the 230-volt power lines, 00 cable, flexible. Next, cut in lighting meter (Thompson), also one for totalizing the load; changed many rosettes (fuseless) for direct circuiting, doing away with rosettes entirely in damp coolers. Next, I spliced our elevator hand cable and flushed spliced part with solder, making a perfect, lasting and safe joint. I then soldered every galvanized and tin bucket used in our sausage room, some twenty in all. Some holes were one-sixteenth inch in diameter, but I managed to do a good job in each case. I then soldered our copper testing kettle for lard (it had been condemned by the local tinner). I then soldered many kinds of metals together—tin, zinc, galvanized iron, cast iron, brass wire, piano wire, solder wire, etc. I then alternated with two dissimilar metals, such as zinc and tin, solder and tin, brass and galvanized iron, to see if there were any combinations the Allen stick would not act upon, but so far found none whatever. I also noticed that the sputtering is very little, if any; in fact, it is so small as to be of no account. I had a good chance to observe this, especially when tinning the large terminals, where some of the stick-flux ran into the terminal sockets. (You will notice that I had many terminals to sweat on the cables and leads.) This I consider a good test for a flux, as if the flux has a tendency to sputter in a terminal, it is dangerous to the eyes. But I wish to congratulate you on having obtained a stick-flux in which this defect does not exist to any extent. I noticed no sputtering while sweating in the terminals. I am now heartily in favor of Allen sticks. I have always used liquid flux till this test, and now I'll use Allen sticks totally. I used but two-thirds of a stick to do all this work, so you can see that I consider it an economical flux. As for the holding power, it's O. K., and the solder sticks admirably—stays right there and seems to flow slower and not fall off, as with some other fluxes I've used. I've tested nine different makes of soldering flux and have found your Allen stick the most successful. I wouldn't be without it."

The Soldering Stick.

The foregoing gives a good idea of a variety of work to which the soldering stick applies. The stick is regarded as the handiest and best form of flux for purposes of convenience. It is handy, easy to manipulate and is especially suited to working with the solder. Being the modern improvement on the "tinker's dam," it permits greater skill in joint making. The stick is rubbed on the heated joint; the solder follows every twist faithfully, conforms to every turn and finds every crevice, filling all holes in about one-tenth the time required by any acid flux. The result is a solid, flush joint stronger than the metal soldered. The Allen soldering stick, as has been proved, will not corrode the wire. By holding the heat right under the flux, it minimizes any loss of insulation experienced with other methods. The stick can be used with equally good results on any kind of metal, in any climate. It is cheaper and cleaner than resin, acids, or other substitutes, and especially important where perfection in detail is required for fine-grained engineering. Allen sticks are round, five inches long, and seven-eighths inch in diameter. There is no waste, as the sticks can be used down to the last atom. A stick is always ready for use.

Soldering Paste, a Soft Flux.

For "out-of-reach" jobs a soft flux sometimes best answers for the purpose. The Allen chemists have put up the Allen-Flux in paste form to satisfy soldering operations where the stick form is not so convenient. The paste is applied, without any preliminary scraping, with a piece of rag, a splinter or even the finger. It bores right through the dirt and carries the solder as the solderer wills. It is very effective on big joints for electric light wiring, switchboards, annunciators, heavy cable laying, pipeway work, etc. It is obvious that on such work this form of flux saves a lot of time. In common with other forms of Allen-Flux, the paste makes a clean joint, eliminates corrosion, and prevents corrosion. There is no sputtering or splodging over the job, and no smearing of solder where it is not wanted. On fine work or on heavy connections it shows impartial effectiveness as well as on all metals and degrees of hardness in solder.

Making Self-Fluxing Solder.

A superior self-fluxing solder is made by dipping the solder into the paste. This is a convenient and economical method of improving over self-fluxing solder preparations that do not flux, and is cleaner to handle.

A Non-Acid Fluid Flux.

Soldering salts is a pulverized form to which the adding of three parts of water to one of salts makes a fluid flux that the solderer can apply with a brush or squirt can, or use as a bath into which the article soldered is dipped. Allen soldering salts have the same advantages as the stick and paste forms. Joints are electrically perfect as well as mechanically. The salts are chemically pure. This fluid flux has been found singularly successful in armature preparing. It is a time-saver, as it will increase soldering operations per day about one-eighth, or a saving of an hour. For general armature and commutator work, however, Allen liquid flux is especially recommended.

To attempt here to treat the different soldering operations prevailing in electrical manufacture and engineering would be indeed a task. They vary directly as the products, although they are features common to a great many different operations. These features determine that a good flux for one is a good flux for all. The only question remaining is the form of the flux, which can be solved easily by the workman understanding the operation. Suffice it to say that soldering is a tremendous industry upon which a large number of other industries depend. Certain dealers handle soldering coppers by the ton! Certain manufacturing centers have from 10,000 to 50,000 workmen a day performing soldering operations. Certain manufacturers have as high as 1000 soldering tools at work and use up huge quantities of flux.

Returning to the word, "flux," this was used as a trade name by L. B. Allen Co., Inc., of Chicago, about sixteen years ago. The word "soldering stick," was coined sixteen years ago by L. B. Allen to describe his newly invented "stick-flux." Allen-Flux is sixteen years old—the oldest flux on the market today.

As chemists who sixteen years ago entered upon the study of flux and its applications, they are still as eager today in experimenting and testing, trying to find some way to improve upon the product that is acknowledged to be the best, its worth proved most conclusively by the number of imitations and substitutions. And, after all, the story of these sixteen years of labor is told in the joint that holds with increased strength and unimpaired insulation—the Allen joint.

The Allen spot trade-mark appears on every package of the genuine Allen.

Fig. 1.—The Allen Soldering Stick, torn tinfoil exposing one end.

Fig. 2.—A box of Allen Soldering Paste.

Fig. 3.—A bottle of Allen Soldering Salts.

DEVICE FOR ATTACHING CROSS-ARMS TO POLES.

The accompanying illustration is intended to show the efficiency of a device used for attaching cross-arms to poles and designed to obviate the necessity of using cross-arm braces. The cross-arms used are sixteen pin ten-foot telephone arms, and the placing of the linemen on the cross-arms is to demonstrate the rigidity of the arm when attached to the pole by the use of this fixture. The man on the bottom arm weighs 230 pounds. It will be noted that under this heavy weight the arm shows no deflection. On the lower buck arm three men are standing without throwing it out of

alignment. It is claimed for this device that it does away with the necessity of cutting a gaen, that it permits of a ready and perfect alignment of the cross-arm, that the valuable room on the "top" of the pole is not taken up as with the unsightly braces, that on transmission lines it does not offer an inductive path for high tension currents as do iron braces. It is more sightly and will hold the strain equally as well. The arm is placed with this device in less time than if braces were used. It is adaptable to double cross-arming or buck-arming and can be used in a great many places where it is inconvenient to use braces. The fixture occupies an inconspicuous place between the arm and pole and is so arranged that the maximum amount of holding power is taken advantage of. J. E. McGillivray, 5795 Shattuck Avenue, Oakland, is the inventor.

JOVIAN DINNER.

Friday evening, September 4th, a score of the Sons of Jove assembled at dinner at Solari's grill. After discussing the various edibles set forth, they proceeded with the more serious business of the evening. Statesman Tracy E. Bibbins emphasized the important part that this order can take in promoting harmony of the electrical interests. His strong plea for singleness of purpose was ably seconded in the various other speeches of the evening. After a most pleasant session the party broke up, just before midnight.

TRADE NOTICE.

The business of the Battery Supplies Company, Inc., of Newark, N. J., has been purchased by the Edison Manufacturing Company, of Orange, N. J. The Edison Manufacturing Company will continue to manufacture the "B S C O" Primary Battery, and will be prepared, on and after September 1st, 1908, to furnish complete cells, renewals and parts of this type promptly, as they will have a large and complete stock of this material on hand at that time.

NEWS NOTES

TELEPHONES.

Prescott, Ariz.—R. S. Masson, at Prescott, is installing a telephone system for the transmission company there.

San Francisco, Cal.—The United States Mint at San Francisco will install a new common battery telephone service throughout the building.

Hamilton, Mont.—The Bitter Root Telephone Co., of Hamilton, is constructing new country lines, and anticipates further enlargements soon.

Phoenix, Ariz.—The Peoples' Independent Telephone Co. at Phoenix is constructing two new lines, one north and one west of town, to serve a number of ranchers.

Bozeman, Mont.—The Bozeman common battery exchange of the Home Telephone Co. has just been completed and the subscribers are being rapidly connected up.

Agnews, Cal.—The Agnews State Hospital for the Insane will install a complete telephone system shortly. Address Leonard Stocking, Medical Superintendent, Agnews, Cal.

Anaconda, Mont.—At Anaconda, work is progressing rapidly on the installation of the exchange of the Home Telephone Co. It is expected that service will be given locally about October 1st.

Sumas, Wash.—L. G. Van Valkenburg, of Sumas, has just perfected the organization of a rural company, to build and operate telephone lines and exchanges in the British Columbia territory adjacent to that point.

Butte, Mont.—J. S. Haley, who has built the independent exchanges at Big Timber, Livingston, and Bozeman, and is now building at Miles City, announces his intention, as soon as that exchange is completed, of arranging for long-distance lines between all of those points and Butte.

Modesto, Cal.—J. S. Hayman, of Modesto, is in the market for poles, wire and telephones for the construction of a telephone system among the ranchers north of town. The organization of this rural company, of which he is president, was perfected about two weeks ago.

Astoria, Ore.—A number of citizens of Astoria, among whom is Geo. W. Sanborn, propose the organization of a local telephone system to serve that community. They will have long-distance connection with the Northwestern Long Distance Telephone Company, if their plans materialize.

Salt Lake City, Utah.—Contractor S. J. Bevan has recently completed the construction of a telephone line from Cedar City to Lund, thirty miles in length. The circuit is a single-grounded iron line, and opens up communication with Cedar City and interior points and Lund Station on the Salt Lake Railroad, where it makes connection with the Western Union Telegraph Co.

Imperial, Cal.—At Imperial Valley, California, notwithstanding reports of active work, nothing has as yet been accomplished except two preliminary meetings of the ranchers. In this valley are five rapidly-developing towns, situated closely together, and the situation for the development of telephone service is ideal. At present, this territory is served by the Consolidated Telephone & Telegraph Company of Arizona, a subsidiary of the Bell, and there are no rural lines nor long-distance facilities out of the valley. Sixty miles away is the terminus of the Home Telephone Company's long-distance lines where they extend out from San Diego, and it is probable that this will be taken advantage of by any company organizing. The Consolidated Company has made a proposition to the organizers to connect any lines they construct in that territory to the Consolidated Company's switchboards, and furnish switching service for forty cents per month per telephone. There is a disposition on the part of those who propose to organize, to not only build and operate rural lines, but to build and operate the exchanges as well. There are now ten thousand acres in cultivation in this valley, a large portion of which is applied to the raising of melons. It is expected that in the next two years twice this area will be cultivated.

TRANSMISSION.

Santa Fe, New Mexico.—John P. Connor, of this city, has filed an application with Territorial Engineer Vernon L. Sullivan for a permit to appropriate water from Pecos River by means of a pipe line for power purposes.

Fort Jones, Cal.—J. W. Downing, manager of the Klondyke Mine, on Ash Creek, states that the owners of the mine will put in a power plant, using their water right on the Klamath River to drive a generator.

Phoenix, Ariz.—J. D. Curry, representative of the Vulture Mine, near Wickenburg, reports that the Boston syndicate, that has taken over the property, will establish a power plant on the Hassayampa River, and will construct an electric line into Vulture.

Palo Alto, Cal.—The Public Utilities Committee of the City Council has awarded the contract for fifteen new transformers for the municipal electric system to the Fort Wayne Electrical Company, the order to be filled at once from the San Francisco office.

Los Angeles, Cal.—Fifty bids for furnishing material for the Owens River electrical power machinery, have been opened, but, owing to the fact that some of the bids were on the basis of f. o. b. Chicago or New York, it will take some time to decide on the contracts.

Salt Lake City, Utah.—A power plant for the Alta district is about to be built by a syndicate of Alto operators, composed of William Thornton, Harvey Bickerton, and Fred Ray. Plans for the work are being drawn by O. H. Scidmore, and the work of building the dam is under way. It is to be built on Little Cottonwood Creek, about two miles below Alto, and will develop from 300 to 400 horsepower.

TRANSPORTATION.

San Francisco, Cal.—The Key Route Railroad Company is preparing to put in concrete piles at its pier at Emeryville.

San Diego, Cal.—Preliminary work has been started by the San Diego Electric Railway on the extension of its line out Washington Street to Mission Hills.

Santa Monica, Cal.—The City Council has granted the Los Angeles-Pacific Company a franchise from the intersection of Main Street and Fremont Avenue, along Fremont Avenue to Ocean Avenue.

La Habra, Cal.—The Huntington electric line, connecting La Habra with Los Angeles via Los Nietos, will be opened on October 1. A depot and freight-house site has been purchased, and a building will be erected at a cost of $6,000.

Georgetown, Cal.—Surveyors were in the field near Pilot Hill last week, and it is supposed that the proposed electric line will follow the old survey which runs from Sacramento to Folsom, and from there crosses over into Eldorado County, passing Salmon Falls, Pilot Hill, Cool, Greenwood, Georgetown, and on up the divide to Lake Tahoe.

Spokane, Wash.—Okanogan Electric Railway Company has installed Horace B. Skinner, formerly of New York, as its general superintendent. It is announced that the line is financed, and that there will be no further delay in building the road in Okanogan County, Washington, northwest of Spokane. The management announces that it has contracts for ore tonnage which will make it a profitable line from the start. Mr. Skinner, who is also a director of the company, has had considerable experience in railroad work, having had charge of construction of the Toledo, Monroe & Detroit line; also assisting on the Detroit & Lansing Railway.

Spokane, Wash.—Panhandle Electric Railway Company has made arrangements to proceed with the work of building the line as soon as the surveys are completed. It is expected to have the road finished from Priest Lake, Idaho to the Fidelity Lumber Co.'s camp during the present season. The following directors were elected for the year: A. J. Smith, D. M. Smith, Andrew Coolin, M. S. Lindsay, Thomas W. Payne, A. Savigne, and C. S. Croswell. The directors later elected the following executive officers: President, D. M. Smith; vice-president, C. S. Croswell; secretary and treasurer, H. H. Wallace; general manager, A. J. Smith; general counsel, M. S. Lindsay.

Spokane, Wash.—Work on the project of electrifying the Great Northern Line in the Cascade Mountains, west of Spokane, is being rushed, and it is expected to complete it in another year. The electric current for the project will be furnished by a power plant being constructed near Chiwaukum, Washington, on the east side of the mountains. Wenatchee Lake, into which a number of mountain streams flow, will be used as a storage reservoir. From the lake a large flume is being built to the side of the plant near Chiwaukum. The plant will have a capacity of 50,000 horsepower, but engineers estimate that by putting in additional equipment and increasing the size of the flume, it can be made to produce 100,000 horsepower. The operation of trains on the mountain division of the Great Northern is regarded as only the beginning of the use of electricity in the handling of railroad trains in Central and Western Washington. The project of using electricity in the Northern Pacific tunnel has also been considered.

Spokane, Wash.—The Spokane, Columbia & Western Railway Company has been incorporated in Washington with a capital stock of $3,000,000, by officials of the Spokane & Inland Empire Electric Railway System, of which Jay P. Graves is president. The incorporators are Clyde M. Graves, Waldo G. Paine, W. G. Davidson, H. B. Ferris, and Will G. Graves. The company will build a line from Spokane to the mouth of the Spokane River, near Miles, Lincoln County, Washington, seventy-five miles, from which point it is reported the road will be extended northward along the Columbia River, on the boundary of Ferry and Stevens County, 100 miles. Surveyors are in the field, and, as the present route does not present any engineering difficulties, it is expected part of the line will be constructed this year. While the articles of incorporation are for electricity and steam, the road will be operated by power from the Nine Mile plant, owned by the Inland people, which is already supplying power for 115 miles of line.

Spokane, Wash.—Spokane Water Power & Traction Co. has filed amended articles of incorporation with the Secretary of State, giving it right to generate, distribute, and sell power, operate railroads, telegraph lines and boat line; also mines, mills and smelters. H. S. Stoolfire and G. Clark Rhodehamel, of Spokane, are president and secretary. The articles were issued as a result of a meeting of the stockholders, who voted to eliminate the preferred stock with its cumulative dividends and convert it into common stock. The company is capitalized at $3,000,000, in 30,000 shares of a par value of $100. The length of life of the corporation is fifty years. The company is building a traction line to connect Spokane with the smelter, six miles northwest of the city. The company proposes to use the line of the Oregon Railroad & Navigation Company from the city to the gravel pit, thence using the line which is now nearly completed along the north bank of the river to a point three-quarters of a mile south of the smelter. There it connects with the old smelter line.

Spokane, Wash.—Washington & Oregon Traction Company has obtained right of way, flume and water privileges on the south fork of the Walla Walla River, south of Spokane, where it will build a 5,000-horsepower plant. The company intends to furnish power for and operate the future electric lines of the Walla Walla Valley and surrounding territory. Rights of way have already been secured by the company for a road-bed to the summit of the Blue Mountains, 330 miles distant from Walla Walla. It is reported the line will be extended to the Wallowa Valley, on the one side of the Walla Walla, and to the Columbia River on the other, thus placing Eastern Washington and Oregon in direct communication with tide-water. The new enterprise is being financed entirely by Walla Walla capitalists, and is under the direction and management of a Board of Trustees composed of E. S. Isaacs, Max Baumeister, C. K. Holloway, Allan H. Reynolds, Samuel Drumheiller, John Smith, W. A. Ritz, and John L. Sharpstein.

Spokane, Wash.—Idaho Railway & Navigation Company has been incorporated in Washington, with a nominal capital of $100,000, to build an electric line from Deadman's Creek, in the northern part of Garfield County, through Asotin County and around the Blue Mountain range, to the Seven Devils Mining District in Idaho, seventy-seven miles. The incorporators are: D. Van Arsdale, president; Samuel L. Tate, secretary; C. W. Hadley, general manager; M. Wood, engineer; Lester P. Edge and Fred Larson. Eleven directors and a council of five will be elected in November, at which time it is expected to have twenty miles of line completed. The single-phase system will be installed. The power house, to be erected on Snake River, and the distributing stations, will cost $64,000, while the line will cost $40,000 a mile. The line will tap coal, cement and mineral deposits; also run through agricultural, orchard and stock districts, not now served by railroads. Three hundred and fifty thousand tons of freight annually is now hauled in wagons, and this can be had at $1 a ton. Traffic connections to Spokane and Eastern and Western points, will be made with two transcontinental lines.

FINANCIAL.

San Juan, Cal.—In the election held here last week, the issue of $12,000 of bonds for waterworks was voted by a large majority.

Dinuba, Cal.—The Town Trustees have voted to call an election to vote on an issue of bonds for the erection of a municipal waterworks plant.

Sausalito, Cal.—The election last week resulted in the proposition to issue $100,000 in bonds for the construction of a waterworks system being carried almost unanimously.

San Francisco, Cal.—The Fourth Extension Water Company has levied an assessment of $1 per share on the capital stock of the company, delinquent September 30.

San Francisco, Cal.—The Equality Oil Company has levied an assessment of one-half cent on the capital stock of the company, delinquent September 21.

Oakland, Cal.—The Oakland Oil Company has levied an assessment of one and one-half cents per share on the stock of the company, delinquent September 16th.

San Francisco, Cal.—The Antioch Oil Company has levied an assessment of three cents per share on the capital stock of the company, delinquent September 17th.

San Francisco, Cal.—The Old Mission Oil Company has levied an assessment of seven and one-half cents per share on the capital stock of the company, delinquent September 18th.

San Francisco, Cal.—General Manager Black, of the United Railroads, says that the receipts of the company for last month were within four per cent of those of August, 1905.

Pasadena, Cal.—On September 24, the voters of this place will act upon the proposition of issuing bonds to the amount of $1,125,000 for the purchase and improving of a waterworks system.

Los Angeles, Cal.—The City Council has passed an ordinance ratifying and confirming the sale to Kountze Bros. and A. B. Leach & Co., of New York, waterworks bonds to the amount of $2,040,000, this being a part of the issue of $23,000,000 Owens river waterworks bonds.

Yuba City, Cal.—At a special meeting of the Town Trustees of this place, the recently-voted issue of bonds to the amount of $30,000 was sold to G. G. Blymeyer & Co., of San Francisco for $32,675, this bid being unconditional. The only other bid received was that of N. W. Halsey & Co., whose bid was $32,370.

OIL.

Lompoc, Cal.—The Associated Oil Company has begun boring for artesian water at Santa Rita.

Santa Monica, Cal.—Los Angeles people have leased 400 acres of land in the southeastern part of this city, and will bore for oil.

Los Angeles, Cal.—The Union Oil Company has made application for a franchise for an oil pipe line on Alameda, Central, Fourth, Mateo, and Willow Streets, and the City Council has ordered that the franchise be offered for sale.

San Francisco, Cal.—The annual meeting of the California Oil Exchange will be held this week, for the election of officers. The old officers have been renominated as follows: William Hinkel, president; James E. Degan, vice-president; A. F. Coffin, treasurer; Joseph L. King, chairman; and T. V. Doub, Secretary.

WATERWORKS.

Winnemucca, Nev.—J. H. Durrell, owner of the Indian Creek Ranch at Buffalo meadows, is arranging to put in a pipe line for irrigation purposes.

Petaluma, Cal.—The City Trustees have decided to install a salt-water pumping plant on the bank of the river, for fire-protection purposes.

San Rafael, Cal.—Fred Howard, president of the Lagunitas Water Company, has put a gang of men at work, preparing for the erection of a dam near Liberty's.

Long Beach, Cal.—Petitions are being circulated here, asking that preliminaries be undertaken looking to the establishment of a municipal water system.

Richmond, Cal.—The Peoples' Water Company is to build new waterworks at the corner of Third and Ohio Streets, in this city, to supply water to the reservoirs on the west side of the city.

Redondo, Cal.—The Board of Trustees will receive bids till September 14 for furnishing and laying a ten-inch pipe line on Beryl Street, 5,800 feet long, a portion to be of cast-iron pipe and the remainder of vitrified glazed pipe.

San Diego, Cal.—The Board of Public Works has asked the City Council for an appropriation of $4,453.78 for the purchase of pipe for a six-inch water main, to be laid on Point Loma Boulevard, from Roseville to Windmill Canyon.

Colton, Cal.—The Board of Trustees has opened bids for furnishing and laying pipe for new water mains in this city. The bid of the Colton Hardware Company for $15,076.69 was the lowest, but the awarding of the contract has been held over.

Vallejo, Cal.—The Board of Public Works has taken steps to secure a new pump for the waterworks, with a capacity of from 750,000 to 1,000,000 gallons daily, to be installed at Lake Chabot. The pump now in use has a daily capacity of only 300,000.

Los Angeles, Cal.—The Indian Bureau has bought, in this city, 1,000 feet of double casing for wells on the Pala Indian Reservation, in Riverside County. For wells on reservations in Arizona and Utah, 40,000 feet of casing will be required.

Los Angeles, Cal.—Sealed bids are being received by the Board of Water Commissioners for re-dipping 7,800 feet, more or less, of 16-inch No. 10 sheet-steel pipe, the re-dipping in asphaltum to be done within thirty days of awarding of contract.

Los Angeles, Cal.—Bids are being received by the Board of Water Commissioners for furnishing lead service pipe as follows: Half-inch A pipe, 8,000 pounds; three-quarter-inch A, 3,000 pounds; one-inch A, 4,000; all pipe to be delivered within thirty days of the awarding of the contract.

TELEPHONE.

Petaluma, Cal.—At the last meeting of the Two Rocks Telephone Company, plans were laid for the extending of the company's system.

Madera, Cal.—H. E. Bigelow and Ray Wooten are promoting a scheme to establish a telephone line between Madera and North Fork.

San Francisco, Cal.—Dr. Ferdinand Butterfield, representing the San Francisco Independent Telephone Company, a branch of the United States Independent Telephone Company, states that he and his associates are willing to purchase the franchise of the Home Telephone Company, if it is found to be valid, for $750,000.